REMARKS

Claims 1-10 are pending in the application for the Examiner's review and consideration. Claim 1 has been amended to more particularly point out and claim the features regarded as Applicants' invention. Claim 1, as amended, is directed to an atomic layer deposition apparatus wherein supply system switching means and exhaust system switching means are synchronized.

Specifically, as required by Claim 1, the atomic layer deposition apparatus is configured such that when the gas supply system is switched to a first supply system, the gas exhaust system is switched to the first exhaust system and the second exhaust system is closed. Further, when the gas supply system is switched to a second supply system, the gas exhaust system is switched to the second exhaust system and the first exhaust system is closed. Support for these changes to Claim 1 can be found at page 2, lines 11-15 and page 12, line 3-page 13, line 22 of the specification. As no new matter has been introduced by these changes, they should be entered at this time. Favorable consideration and allowance are respectfully requested for Claims 1-10 in view of the foregoing amendments and the following remarks.

Rejections under 35 U.S.C. § 102

Claims 1 and 3-6 stand rejected as allegedly anticipated by either U.S. Patent No. 5,484,484 to Yamaga et al. ("Yamaga"); U.S. Patent No. 6,383,300 to Saito et al. ("Saito") or WO 02/15243 to Shinriki et al. ("Shinriki"). The reasons for the rejections are set forth in paragraphs 2-4, respectively, of the Official Action. For the reasons that follow, these rejections are respectfully traversed.

To establish a *prima facie* case of obviousness, all the claim limitations must be taught or suggested by the prior art. *In re Royka, 490* F.2d 981, 180 USPQ 580 (CCPA 1974).

Claim 1, as amended, recites an apparatus for performing atomic layer deposition. As disclosed in the specification at page 1, lines 12-30, atomic layer deposition involves individually supplying source gases to a substrate such that the source gases react with each other on the substrate but do not react with each other before reaching the substrate. Yamaga and Saito each fail to disclose an atomic layer deposition apparatus as required by Claim 1.

Yamaga discloses a reduced-pressure CVD apparatus wherein processing gases such as ammonia and dichlorosilane are supplied to an interior of the apparatus and a silicon nitride layer is formed by the *gas-phase reactions* of ammonia and dichlorosilane (see, for example, columns 4-6 and Figures 1-2 of Yamaga). Saito discloses a similar apparatus wherein source gases such as ammonia and dichlorosilane are supplied to a reactor tube to form a silicon nitride film on a substrate therein. By opening valves (VB1 and VB2), the source gases of Saito are simultaneously supplied to the reaction tube from first and second gas sources (see column 11, lines 8-46 of Saito). Because neither reference discloses an apparatus adapted to perform atomic layer deposition, neither reference can anticipate Claim 1. Withdrawal of the rejections over Yamaga and Saito are respectfully requested.

Claim 1, as amended, further recites a control means for controlling a supply system switching means and an exhaust system switching means. The supply system switching means and the exhaust system switching means are adapted to be controlled in synchronization so as to close the second exhaust system and switch the gas exhaust system to the first exhaust system when the gas supply system is switched to the first supply system, and close the first exhaust system and switch the gas exhaust system to the second exhaust system when the gas supply system is switched to the second supply system.

According to the invention, by providing synchronization of the supply system switching and the exhaust system switching, the formation of undesirable reaction byproducts in both the processing apparatus and the exhaust lines can be prevented.

Shinriki discloses a substrate processing apparatus adapted to perform atomic layer deposition. The apparatus of Shinriki comprises first and second processing gas supply units and first and second exhaust openings (see Abstract). However, the exhaust openings of Shinriki comprise *conductance valves* that can restrict the flow of gas, but which do not completely stop the gas flow. Thus, as required by Claim 1, the apparatus of Shinriki does not comprise supply system switching means and exhaust system switching means that operate in synchronization such that when the gas supply system is switched to a first supply system the gas exhaust system is switched to a first exhaust system and the second exhaust system is closed, and when the gas supply system is switched to a second supply system the gas exhaust system is switched to a second exhaust system and the first exhaust system is closed. As disclosed at column 5, line 59-column 6, line 4 of Shinriki, when one exhaust volume adjustment valve is set to "wide open", the other exhaust volume adjustment valve is set to a small opening "rather than completely shut."

Because Shinriki merely discloses conductance valves that reduce gas flow, but which do not stop gas flow, the apparatus of Shinriki cannot prevent a first gas source from mixing with a second gas source within the processing container or exhaust line. Because Shinriki fails to anticipate Claim 1, withdrawal of the rejection is respectfully requested.

Rejections under 35 U.S.C. § 103

The rejections of Claims 2 and 7-8 as allegedly obvious over Yamaga or Saito or Shinriki in view of U.S. Patent No. 6,334,938 to Sekine et al. ("Sekine") are respectively traversed. The reasons for the rejections are set forth in paragraphs 6, 8 and 10 of the Office Action. Sekine, which was cited for disclosing a trap and recovery line and a three-way valve, fails to remedy the deficiencies of the primary references with respect to Claim 1. Thus, Claims 2 and 7-8, which depend from Claim 1, are patentable over the cited references for at least the reasons that Claim 1 is patentable. Withdrawal of each of the rejections of Claims 2 and 7-8 is respectfully requested.

The rejections of Claims 9 and 10 as allegedly obvious over Yamaga or Saito or Shinriki in view of U.S. Patent Application Publication No. 2003/0200929A1 to Otsuki are respectively traversed. The reasons for the rejections are set forth in paragraphs 7, 9 and 11 of the Office Action. Otsuki, which was cited for disclosing $TiCl_4$ and NH_3 as precursor materials, fails to remedy the deficiencies of the primary references with respect to Claim 1. Thus, Claims 9 and 10, which depend from Claim 1, are patentable over the cited references for at least the reasons that Claim 1 is patentable. Withdrawal of each of the rejections of Claims 9 and 10 is respectfully requested.

It is submitted that the difference between the claimed subject matter and the prior art are such that the claimed subject matter, as a whole, would not have been obvious at the time the invention was made to person having ordinary skill in the art.

In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #010986.52820US).

Respectfully submitted,

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